Journal of Applied Health Sciences and Medicine 1(1) (2021) 54-68

# Efficacy of Using Objective Structured Clinical Examination on Competencies of Nursing Students in Health Assessment Skill

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Received: 16 May 2021; Accepted: 11 June 2021; Published: 15 June 2021

**ABSTRACT**

**Background:** OSCEs (objective structured clinical examinations) are a great method for assessing safe psychomotor skills in nursing undergraduate programmers. This study examined the usefulness of the objective structured clinical examination of the health assessment skills of nursing students. **Methods: Design**: The second and fourth year of the Faculty of Nursing was designed almost experimentally (pre-post) for "140" nursing students. **Setting:** Faculty of Menoufia University in Egypt Medical Surgical Care Laboratories. **Data collection tools**: The first tool is a structured interview survey. The report was divided into six sectors: the age of the students, the name of the assessor, the general understanding of the OSCE by the students, the perspective of the OSCE system by the students, the assessment of the OSCE quality assessment, and, finally, a perception of the validity and reliability of OSCE. The second instrument is Health Evaluation Checklist Station 1. The final tool is Sample Question Station 2. **Results:** After intervention students improved statistically significantly compared with before intervention, the students' general knowledge about the OSCE system, the OSCE system perspective, OSCE attribute assessment and quality evaluation, the validity and reliability perception of OSCE test tool, health assessment checklist stations and sample question stations. **Conclusions**: These findings show that nursing students understand that OSCEs measure what they're supposed to measure. Also, the utilization of OSCE as a helpful teaching method to improve nursing students' health assessment competencies. Furthermore, it allows small groups of students to practice how to behave in a real-life patient care situation in a safe and regulated environment. So, it highly recommended that evaluating nursing students through OSCE should be used in other setting, to enhance competencies of nursing students.

**Keywords**: Nursing Competencies, Structured Clinical Examination, Health Assessment Skill

## 1. Introduction

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Skill is used to describe an overall, global perception that the information, clinical skills and attitudes of a healthcare worker are sufficient at the end of a given training [1]. [2] and [3] characterised competence assessment as an integrated assessment form, in the process of seeking and combining understanding, know-how, technical expertise, problem-solving, attitudes and ethics. Clinical assessment needs to ensure that clinical students are fully aware of clinical methodologies, are able to perform care procedures accurately and employ critical thinking [4]. Evaluation of clinical practises is a complex task that keeps nursing educators strained [5].

Miller's clinical expertise evaluation pyramid is a framework to identify the level of skills to be reached by students. Students display their knowledge in a hypothetical circumstance like an OSCE when they walk up the pyramid to illustrate how. It includes: 'knowledge' (knowledge) is 'know how' (competence) followed by 'shows how' (performance) and 'does' (activity) It includes: (action). The knowledge involves the reminder of fact (multi-choice issues, essay type, oral test), the knowledge-show (multi-choice, test type, oral exams) involves a contextual evaluation, and the 'does' means a competency evaluation (Simulations, OSCs), while performance testing (virtual observation) [6; 7]. Miller's pyramid serves as an examination of and validation of clinical qualifications in the nursing profession [8; 7].

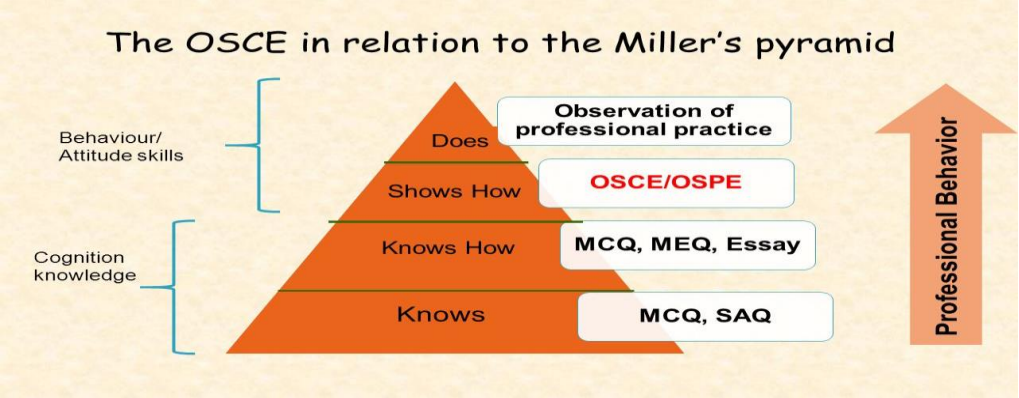


**Figure 1.** Assessment of Clinical Skills/Competency. OSCE within Miller's Pyramid [6].

A health assessment is an intrinsic aspect of nursing skills, a vital part of a health field in the last 20th century [5] which is taught and emphasised at each level of nursing. The level of competence also incorporates the knowledge received by nursing students from classrooms as they ensure developmental skills in the clinical environment which is a major part of the quality of patient treatment [9]. However, these abilities require improved technology for the future due to increased technology in health systems. In addition, the implementation of core nursing competence in standard training among nursing graduates will provide support for the demands of skilled nurses in the future [5, 10, 11].

Traditional clinical nursing assessments do not evaluate the skills of clinical reasoning and clinical competence. It's also tough for large groups of students to manage the acquisition of problems and critical thinking. The difficulty, particularly as the number of students increases, is to have such an objective assessment instrument to fully gauge student's clinical competence [12].

OSCE is a way where the student is evaluated for clinically qualified abilities in a number of simulated stations that may include a history collecting, physical assessment, laboratory research and treatment [13]. The method is the objective structured clinical examination. They said that they might be employed on their own or with a different evaluation form as a formative or summative assessment [14]. The scenarios, simulations or case studies are often used by students. They also expect information to be interpreted, clinical judgments taken, specialised skills performed, and contacts with other teams, patients, or members of the family [7].

Egyptian nursing schools use a range of evaluation policies that are suitable for evaluating the performance of students. In Egypt, the OSCE is a new concern requiring improved nursing skills. According to an Egyptian study on medical and nursing competence evaluations, four kinds of pupils were identified in both the medical and nursing faculties (medical and infirmier, nurses and house officers) [15].

For the efficiency of the OSCE process, preparing students and providing feedback on their performance afterwards is crucial. Some nursing students experienced considerable levels of stress and a loss of control in the OSCE, which was due to a lack of training, according to the study's findings. [16; 17].

## 2. Research hypothesis:

I. Nursing students will have better competencies in practicing health assessment skills after intervention than before intervention.
II. Nursing students' general knowledge, perspective of, evaluation of attributes, Quality assessment and validity and reliability perception of OSCE are enhanced after intervention than than before intervention.

## 3. Aim

The objective of this study was to investigate the effectiveness of an objective structured clinical examination of nursing students' competences for medical assessment.

## 4. Subjects and Methods

### 4.1. Study design

Aquasi-experimental pre-post-test design was used.

### 4.2. Setting:

The study was carried out in the Faculty of Nursing, University of Menoufia, Egypt.

### 4.3. Study participants

There was a convenience sample of 140 infirmer students who volunteered to participate in the 2019 academic year in the Medical Surgical Nursing and the Community Health Nursing Department. It was carried out following the consent of the Ethics Committee of the Faculty of Nursing, University

of Menoufia, Egypt. In addition, the students received their verbal informed permission. The aim of the study and the procedures were described during the initial interview.

**4.4. Sample Size:**

A 95% confidence level (error = 5%) and a study power of 80% (error =20%) were determined for the sample size. The sample of 140 subjects from the faculty of nursing were chosen with the help of the Epi-info computer programme.

**4.5. Tools of Data Collection**

After analyzing the literature used in this study, the researcher designed the study tools. It is made up of:

*4.5.1 Tool 1: -A structured interview questionnaire.* Reliability was calculated using **Cronbach's alpha coefficients**. It was 0.89 indicate good reliability. It consisted of six parts:

Part 1: 2 items on the student age and the name of the evaluator.

Part 2: assessment of general knowledge of the students of OSCE and 4 subjects, for example knowledge of the OSCE definition, exam purposes, knowledge about the OSCE types and OSCE types.

Part 3: To evaluate OSCE student's vision, 13 things such as measurement of course objectives are included, credible, consistent, and analytical questions are needed. Part 3: The Researcher requested that the students score their responses on a two-point scale.

Part 4: The evaluation of OSCE attributes by students includes 12 topics, such as fair, broad knowledge coverage, more time required for station tests and well-administered examinations. The researcher asked the students to assess their answers on a three-point scale, discontent, neutrality and consensus.

Part 5: The assessment of student performance quality evaluation of OSCE contained 7 items including the full knowledge of the nature of the examination, work represented the teachings, appropriate time for each station and clear guidelines. The researcher asked students, who disagreed, were neutral and agreed on their comments in a three-point scale.

Part 6: evaluating the OSCE's validity and reliable perception among students, including four elements like the OSCE scores, provide real measurements of critical clinical skills, standard OSCE scores, practical and valuable experience in OSCE, and personality and social relationships not affected at all from OSCE scores. Students were asked to measure their answers in a 3-point scale; disagree, neutral and agree.

*4.5.2Tool 2: Health Assessment Checklist Station One.* In the following fields, it measured student skills: Clinical procedural competencies; technical competencies and communication competencies.

The evaluation criteria and the evaluation system utilised by the health assessment station; the checklist was used initially to evaluate station-specific tasks. This was replaced by a global rating

scheme with criteria associated with the above three areas of competence. For statistical analysis of test outcomes, a numerical scale was utilised. Therefore, **health assessment Checklist station was graded as follows:**

Unmade (0 score); failing, not competent (1 score); passing, not confident (2 score); confident pass (3 score); good, confident, skilfully technique-based (4 score); (5 score). Calculated reliability with alpha coefficients from Cronbach. The reliability of 0.90 was good.

*4.5.3 Tool 3: -Auscultation Question Station two;* was graded as follows:

Questions 1 and 3**:** Wrong answer (0 score); Incomplete correct answer (1 score) and Complete correct answer (1 score); Questions 2, 4 and 5: Wrong answer (0 score) and **Correct answer** (1 score)

Time Schedule for Two OSCE Stations: **-**General health assessment Checklist station 1 (20 minutes) and sample question station 2 (10 minutes). Reliability was calculated using Cronbach's alpha coefficients. It was 0.92 indicate good reliability.

***4.6 Procedure for data Collection:***

***4.6.1***. *Study Period:*the study started from 1 February to 25 May 2019.

***4.6.2***. ***Validity of the tools*****:** It was tested for content validity by jury of four experts in the field of nursing to ascertain its relevance.

***4.6.3. Reliability of tools*** *were performed before starting data collection, and written separately within each tool.*

***4.6.4***. ***Pilot Study****:* It was conducted to test the practicality, applicability and to estimate the time needed to fill the questionnaire. The pilot study was conducted on 14B.Sc. nursing students.

***4.6.5***. At the beginning of the research, students were divided into groups, 20 students for every seven faculty members (trained observers). The clinical scenario was trained to role-play by seven faculty members. Every student was assessed for her general knowledge about OSCE, perspective of OSCE system, evaluation of the OSCE attributes, evaluation of quality of performance of OSCE, perception of validity & reliability of OSCE and OSCE assessment format for health assessment checklist station (Pre-test). It took about four weeks. An OSCE was then developed. Each student was given feedback after the first assessment. The researcher gave a planned presentation on OSCE, covering the definition of OSCE, the aim and types of OSCE exams, and the technique of health assessment, and demonstrated it for each group separately utilizing role-playing and teaching clinical videos about OSCE exam scenarios and health assessment.

In order to enable the students to conduct medical assessments, they first watched educational clinical videos before participating in five roles play and demostration approaches. Secondly, the researcher addressed questions regarding films to students and then encouraged them to take part in the explanation of videos by the researcher until the researcher was happy of their comprehension. It took sixty to ninety minutes. It took eight weeks to finish. Students were evaluated with the same

OSCE evaluation format and sample questions were taken for Station 2 at the end (only Post-test). It has taken 4 weeks to finish.

***4.6.6. Evaluation:*** Using OSCE stations it was objective to evaluate the performance of learners in a clinical environment. The student conducted health evaluations and answered sample auscultation questions while a professional observator evaluated the learner using the objective checklists established for each station. They also included an observed role play based on skills in the health assessment. The members of the faculty were educated regularly to assume the part of each student in the clinical scenarios; the trained observer remained mute, save for the answer of methodological questions to be given constructive critique.

***4.6.7. Statistical analysis***

Using the statistical package of the Social Studies version 19, the data collected were tabulated and statistically analysed. As numbers and percentages, categorical variables were given. In the Wilcoxon singed grading test, differences between categories of each variable were statistically assessed before and after interventions (Z). The overall mean score of each station was shown and the average and standard deviation and the difference was compared with the pairing t test before and after intervention. The level of significance was adopted at $p < 0.05$.

## 5. Results

Participant Characteristics

A total of 140 students in the Medical Surgical and Community Health Nursing departments on the academic year 2019completed the intervention, with a mean age 20.86±0.25 years and arrange of 19-21 years and all of them were female.

A statistically significant difference between pre-intervention and postamation results of the students with regard to the health evaluation skills of OSCE station after intervention was suggested by **Hypothesis** 1, which suggested that nursing students had better skills to practise health assessment after intervention (Table 1 & 2). (0.001).

**Hypothesis** 2, which stated that following intervention the students would increase the general knowledge of nursing students, their viewpoint, the evaluation of their qualities, the evaluation of performance quality and the validity and confidence perception of OSCE (Table 3). The general knowledge of the students about OSCE, the student's view on OSCE, OSCE students' evaluation of the attributes of the OSEC, OSCE student performance quality evaluation, OSCE students' perception of validity and reliability, OSCE Health Assessment Station 1 and sample OSCE Station 2 score total after interventions was improved statistically. (4.70+0.87, 37.34+1.53, 30.99+1.89, 19.13+1.83, 11.17+1.27, 100.07+6.60 and 5.80+0.95 respectively) compared with (0.70+0.80, 14.03+1.34, 18.01+2.28, 10.14+1.51, 6.29+1.23, 42.38+14.02 and 2.43+1.21) respectively before intervention where p= (0.001).

**Table 1.** Percentage of Health Assessment Skills Performed by Studied Students before and after Intervention (N=140)

| **Items of Health Assessment** | **Pretest** | | | **Post-test** | | | **Z** | **p** |
|---|---|---|---|---|---|---|---|---|
| | Fail/ not competent | Pass | Competent Pass | Fail/not competent | Pass | Competent Pass | | |
| Warm approach to patient. | 20 | 20.0 | 60.0 | 1.4 | 1.4 | 97.2 | 5.865 | 0.001 |
| Explains procedure and asks patient to report discomfort. | 22.9 | 27.1 | 50.0 | 1.4 | 0.0 | 98.6 | 6.392 | 0.001 |
| Observes patient for signs of distress or discomfort throughout exam. | 60.0 | 30.0 | 10.0 | 1.4 | 1.4 | 97.2 | 7.213 | 0.001 |
| Takes vital signs (or comments that these would be measured). | 21.4 | 32.9 | 45.7 | 2.8 | 1.4 | 95.8 | 5.860 | 0.001 |
| Assesses the general appearance of the patient: health status, weight, stature, posture, color, hygiene, odors, dress. | 11.4 | 41.4 | 47.2 | 5.7 | 0.0 | 94.3 | 5.291 | 0.001 |
| Comments on how ill the patient is: shock, dehydrated, febrile, in pain, restless, comfortable. | 65.7 | 28.6 | 5.7 | 4.3 | 1.4 | 94.3 | 7.173 | 0.001 |
| Comments on alertness of patient: confused, drowsy, fully conscious, unconscious. | 80.0 | 17.1 | 2.9 | 5.8 | 0.0 | 94.2 | 7.274 | 0.001 |
| Observes mood and behavior: cooperative, happy, sad, resentful, and depressed. | 72.9 | 14.3 | 12.9 | 4.3 | 1.4 | 94.3 | 6.978 | 0.001 |
| Checks the nutritional status: obese, wasted, muscular, fat distribution, edema. | 57.1 | 32.9 | 10.0 | 4.3 | 0.0 | 95.7 | 7.094 | 0.001 |
| Checks and compares hands (size, cold, warm, sweaty, tremor, muscle wasting). | 52.9 | 21.4 | 25.7 | 2.8 | 1.4 | 95.2 | 6.610 | 0.001 |

**Table 2. Health Assessment Skills Items Performed by Studied Students before and after Intervention (N==140)**

| Items of Health Assessment | Pretest | | | Post-test | | | Z | p |
|---|---|---|---|---|---|---|---|---|
| | Fail/ not competent | Pass | Competent Pass | Fail/not competent | Pass | Competent Pass | | |
| Observes nails (shape, contour, condition, color, clubbing, pitting, splinter hemorrhages). | 42.9 | 25.7 | 31.4 | 1.4 | 0.0 | 98.6 | 6.621 | 0.001 |
| Inspects and compares palms (erythema, contracture, etc). | 64.3 | 17.1 | 18.6 | 2.8 | 2.9 | 94.3 | 5.597 | 0.001 |
| Inspects and palpates joints and tendons of the hand and forearm (symmetrical, asymmetrical, swelling or nodes on fingers or tendons, deviation, posture, deformity, xanthomas). | 54.3 | 34.3 | 11.4 | 2.8 | 4.3 | 92.9 | 6.772 | 0.001 |
| Assess; color, texture, and temperature and hair distribution of the skin in general. Also sweating, dryness, any lesion, elasticity, turgor. | 30.0 | 40.0 | 30.0 | 1.4 | 1.4 | 97.2 | 6.716 | 0.001 |
| Check lips and tongue for cyanosis (central or peripheral). | 14.3 | 42.9 | 42.9 | 1.4 | 0.0 | 98.6 | 6.427 | 0.001 |
| Assess the tongue for size, moisture, dryness, color, smoothness. | 84.3 | 12.9 | 2.8 | 1.4 | 0.0 | 98.6 | 7.596 | 0.001 |
| Check's teeth, gums, throat, tonsils, and buccal mucosa. | 14.3 | 32.9 | 52.8 | 2.8 | 2.9 | 94.3 | 5.616 | 0.001 |
| Smell's patients breathe. | 82.9 | 2.9 | 14.2 | 11.4 | 2.9 | 85.7 | 7.301 | 0.001 |
| Examines the appearance of | 18.6 | 28.6 | 52.8 | 2.8 | 0.0 | 97.2 | 6.43 | 0.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| head and hair, neck, face complexion and color, ears and nose. | | | | | | | 1 | 1 |
| Notes the appearance of eyes (exophthalmos, squint, redness, and conjunctiva for anemia, sclera for jaundice, arcus senilis, and cornea). | 18.6 | 31.4 | 50.0 | 4.3 | 5.7 | 90.0 | 5.184 | 0.001 |
| Examines eyelids for retraction, swelling, white or yellow deposits, and xanthelasma. | 37.1 | 32.9 | 30.0 | 7.1 | 0.0 | 92.9 | 5.948 | 0.001 |

**Table 3. Comparison of Total Score before and after Intervention (N==140)**

| **Variables** | Before intervention | After intervention | **t** | **p** |
|---|---|---|---|---|
| 1. General knowledge about OSCE | M(SD) 0.70(0.80) | M(SD) 4.70(0.87) | 28.028 | 0.001* |
| 2. Students' perspective of OSCE system | 14.03(1.34) | 37.34(1.53) | 95.629 | 0.001* |
| 3. Students' Evaluation of the OSCE Attributes | 18.01(2.28) | 30.99(1.89) | 35.975 | 0.001* |
| 4. Student's evaluation of quality of performance of OSCE | 10.14(1.51) | 19.13(1.83) | 36.863 | 0.001* |
| 5. Students' perception of validity & reliability of OSCE | 6.29(1.23) | 11.17(1.27) | 24.310 | 0.001* |
| 6. Health assessment checklist station 1 | 42.38(14.02) | 100.07(6.60) | 28.668 | 0.001* |
| 7. Sample question OSCE station 2 | 2.43(1.21) | 5.80(0.95) | 16.800 | 0.001* |

*Significant

## 6. Discussion

OSCE is one of the most important approaches for the evaluation of clinical skills in medical education [18]. The evaluation approach was created largely to solve fundamental shortcomings in traditional types of clinical evaluations, such as dependability and long-term lack of generalisation [19; 20]. The aim of this study is to investigate the effectiveness of objective and structured clinical exams in health assessment expertise for nursing students.

**Answering research hypothesis number one** concerning the ability of the students to conduct health evaluations by OSCE station items before and after intervention. The results of this investigation, as demonstrated (Table 1&2). In line with the present study [21] findings, the training programme, based on the simulation model, effectively enhanced insertion capacity in the chest tube. The finding of the present investigation was equally consistent,[22] after a training intervention that included video assessment and demonstration, that revealed considerable improvements. The experimental groups have found that "their performance through video case-based education that influence their clinical decision-making by the midwifery students with standardised patients has been much improved," [23] reports. This can result from the utilisation of educational content and educational technology by using role playing and video scenarios in clinical skills teaching and enhancement.".

**Answering research hypothesis number two** the study results showed that the students' overall understanding of OSCE, the evaluation of its attributes, the quality of the OSCE performance, the validity and reliability perception of OSCE, the health analysis OSCE Station 1 as well as the sample question OSCE Station 2 have an overall post-intervention score compared to before. OSCE Score before and post-intervention (Table 3). The above results of this study comply with [24], which states, "The OSCE's basic advantage is to improve the objectivity for evaluation, particularly for young pupils. On the contrary, a majority of students considered OSCE to be a fair evaluation method, since it covered a broad range of knowledge and helped them reduce their chance of failure. Most students thought the information degree was sufficient."

Other studies [25; 26] which indicated that most students believed they were fairly highlighted have also reported their fairness. "The order of the OSCE station, the reflection of the tasks taught, the clarity of examination instructions and the time in each station were most good feedback from the students." The study conducted by [27] found significant improvements in the technical ability from pre-test ($p < 0.01$) was similar to the study findings. This was also similar to what [28] determined that "every scoring of the OSCE station, such as physical examination measuring and problem-solving abilities, was much improved." Multimedia can be an effective way of providing the basic and highly profiled abilities.

The results of the present study demonstrated statistically significant improvements in student knowledge after intervention as well as pre-intervention distribution in terms of their knowledge distribution, contentment, and preference to the OPSCE and their perspective on the OSCE system. This was seen after testing compared to pre-testing. In addition, the students' happiness and

preference for OSCE examination was statistically significantly improved following the intervention than before. Furthermore, statistically significantly improved student satisfaction with all elements of the OSCE system after intervention was observed with regard to the student perspective on the OSCE system, rather than before. The study was carried out [29] in line with the present study finding; most students received fundamental OSCE knowledge and correctly recalled it in the post-test and retention assessments. The results show that multimedia can be a viable way of offering fundamental and high-profile capabilities in this regard. This finding is analogous to the one from [29] in Egypt for student satisfaction with the OSCE, who reported that most students assessed are happy with the OSCE and cited several of its advantages in the data gathering instrument.

In addition, the outcomes of the current study are confirmed by [30] who indicated that the majority of the sample he received was OSCE satisfied and preferred it to conventional tests. Furthermore, the results of the study are compatible with [31], which states that the majority of students are content with the programmed and are satisfied with the effect it plays on enhancing clinical skills. Furthermore, [32] "OSCE assessment of course targets, the increase in teaching levels, the related practice theory, well-developing exams, increased decision-making capacity, and enhanced assessment methods has been noted as the OSCE's advantages over traditional methods of assessment, followed by conventional assessment methods, as well as conventional methods. This may result from the students' benefit from educational content as well as from the usage of educational technology through the use of role play and video scenarios in teaching. With regard to the assessment of the students' qualities, the present data show that following the intervention, most students agreed that the examination was fair, that the examination was properly managed and that flaws were addressed; that the examination was well organized and sequenced. The findings are comparable to what was reported [33] in which "most students considered the OSCE as a fair assessment method covering a wide range of knowledge, allowing them to gain competence in some areas and minimizing their likelihoods of failure." In addition, the results of the current study showed that students evaluate the quality of the performance of OSCE before and after intervention, the majority agree that the students have had opportunities to study, instructions are clear, they are well aware of the nature of the tasks of the exams, the work they have been taught reflected and the tasks they have requested are fair rather than before intervention. The investigations carried out by [34; 24; 26; 24and 33] have indicated, in keeping with this study finding, that the OSCE is a realistic assessment of nursing practical courses. This evaluation could evaluate a wide range of learning material. In addition, most students saw OSCE as an equitable evaluation instrument that covered a broad field of knowledge that enabled them to offset and lowered their chances of failure in some clinical areas. In regard to the students' perception of validity and reliability before and after an intervention, the study's findings show that, following an intervention, most students are agreed on practical and useful experiences of the OSCE, the OSCE scores are an effective measure of essential clinical skills and OSCE scores are standardised. Findings that demonstrated that most students had good reactions about the clarity of examination instructions, the sequence of OSCE stations, the reflection of the teaching assignment and the time at each station, support this study conclusion [34;24];. Moreover, [18] has shown that following the intervention, the experimental group produced more substantial advances in knowledge and also greater levels than the control group of learners (P=.001; d=1.13). The benefits of educational material and the usage of educational technology for

improving student consciousness of the OSCE can be linked to this. In addition,[35] the student's replay % on OSCE subjectivity was increased from more than one third to more than half with statistically significant differences.

### 7. Conclusions

- The study's results provide important evidence that the use of OSCE as a valuable teaching tool to enhance health assessment competencies of nursing student's skills.
- Majority of students agree that OSCE is practical and useful experience, provide true measure of essential clinical skills, and the majority of the studied students was satisfied with it and mentioned a lot of its advantages.
- The nursing students realized that OSCE actually measure what they are intended to measure.
- OSCE scores not affected by personality and social relation.

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